CTEH CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH,LLC

# Mission Incident
# Santa Paula, CA
# Preliminary Summary of Air Monitoring Results
# December 09, 2014

Prepared by
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CTEH CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH,LLC

## Introduction

Center for Toxicology and Environmental Health, LLC (CTEH®) continued air monitoring in support of response activities following a vac truck explosion and fire in Santa Paula, CA.

This submittal summarizes air monitoring data for December 09, 2014 07:00 to December 10, 2014 07:00.

## Real-time Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Manually-logged real-time air monitoring was conducted for chlorine ($Cl_2$), hydrogen sulfide ($H_2S$), hydrochloric acid (HCl), percent of the Lower Explosive Limit (LEL), oxygen ($O_2$), peroxides, particulate matter (10 micron particles, $PM_{10}$), sulfur dioxide ($SO_2$), sulfuric acid ($H_2SO_4$), and volatile organic compounds (VOCs), with instruments such as Gastec® pumps with chemical-specific colorimetric tubes, RAESystems® MultiRAE Plus and MultiRAE Pro PID with chemical-specific sensors, and TSI® AM510s for particulate matter. Monitoring was conducted by CTEH® personnel in the work area, at fixed locations in the surrounding community, and along the perimeter of the facility in the community. Table 1 summarizes monitoring data for manually-logged real-time readings. Maps including the site location, fixed community real-time air monitoring locations, aerial site photo, and roaming monitoring are included in Appendix A.

CTEH® monitored RAESystems© AreaRAE units with ProRAE Guardian system at four locations on the fence line of the facility within the work area and an additional three units throughout the day by frac tanks near the designated decon areas. AreaRAEs were equipped with sensors to detect VOCs, LEL, $H_2S$, and $SO_2$. Table 2 summarizes monitoring data for AreaRAE monitoring. AreaRAE graphs displaying real-time air monitoring data as well as 15-minute rolling averages and a map depicting AreaRAE locations are included in Appendix B.

Particulate monitors were data-logged along the facility perimeter collocated with AreaRAE stations 1, 2, 3, and 4. The AM510 located at the monitoring station collocated with AreaRAE Unit 03 showed one instantaneous detection of 19.885 $mg/m^3$ at approximately 23:30 on 12/9/2014. Field responders noted that running vehicles in the area were present during that time. Particulate readings on this unit did not exceed 2.151 $mg/m^3$ prior to this instantaneous detection. Table 3 summarizes data-logged $PM_{10}$ data from these units.

Table 1: Manually-Logged Real-Time Air Monitoring Summary[1]
December 09, 2014 07:00 – December 10, 2014 07:00

| Location Category | Analyte | Instrument | No. of Readings | No. of Detections | Avg. of Detections | Concentration Range[2] |
|---|---|---|---|---|---|---|
| **Community** | $Cl_2$ | Gastec 8La | 6 | 0 | NA | <0.05 ppm |
| | $H_2S$ | MR+ / MR Pro | 27 | 0 | NA | <1 ppm |
| | HCl | Gastec 14L | 6 | 0 | NA | <0.05 ppm |
| | LEL | MR+ / MR Pro | 26 | 0 | NA | <1 % |
| | $O_2$ | MR+ / MR Pro | 26 | 26 | 20.9 | 20.9 - 20.9 % |
| | Peroxides | Gastec 32 | 6 | 0 | NA | <0.1 ppm |
| | $PM_{10}$ | AM510/Dusttrak | 27 | 27 | 0.012 | 0.004 - 0.049 $mg/m^3$ |
| | $SO_2$ | MR+ / MR Pro | 26 | 0 | NA | <0.1 ppm |
| | $H_2SO_4$ | Gastec 35 | 6 | 0 | NA | <0.2 $mg/m^3$ |
| | VOC | MR+ / MR Pro | 28 | 0 | NA | <0.1 ppm |
| **Exclusion Zone** | $Cl_2$ | Gastec 8La | 1 | 0 | NA | <0.05 ppm |
| | $H_2S$ | MR+ / MR Pro | 5 | 0 | NA | <1 ppm |
| | LEL | MR+ / MR Pro | 6 | 0 | NA | <1 % |
| | $O_2$ | MR+ / MR Pro | 5 | 5 | 20.9 | 20.9 - 20.9 % |
| | Peroxides | Gastec 32 | 1 | 0 | NA | <0.1 ppm |
| | $SO_2$ | MR+ / MR Pro | 5 | 0 | NA | <0.1 ppm |
| | $H_2SO_4$ | Gastec 35 | 2 | 0 | NA | <0.2 $mg/m^3$ |
| | VOC | MR+ / MR Pro | 6 | 0 | NA | <0.1 ppm |
| **Work Area** | $Cl_2$ | Gastec 8La | 6 | 0 | NA | <0.05 ppm |
| | $H_2S$ | Gastec 4LL | 3 | 0 | NA | <0.1 ppm |
| | $H_2S$ | MR+ / MR Pro | 27 | 0 | NA | <0.1 ppm |
| | HCl | Gastec 14L | 3 | 0 | NA | <0.05 ppm |
| | LEL | MR+ / MR Pro | 27 | 0 | NA | < 1 % |
| | $O_2$ | MR+ / MR Pro | 26 | 26 | 20.9 | 20.9 - 20.9 % |
| | Peroxides | Gastec 32 | 3 | 0 | NA | <0.1 ppm |
| | $PM_{10}$ | AM510/Dusttrak | 5 | 5 | 0.005 | 0.003 - 0.009 $mg/m^3$ |
| | $SO_2$ | Gastec 5Lb | 4 | 0 | NA | <0.1 ppm |
| | | MR+ / MR Pro | 8 | 0 | NA | <0.1 ppm |
| | $H_2SO_4$ | Gastec 35 | 3 | 0 | NA | <0.2 $mg/m^3$ |
| | VOC | MR+ / MR Pro | 27 | 0 | NA | < 0.1 ppm |

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 2: AreaRAE Air Monitoring Summary[1]
December 09, 2014, 2014 07:00 – December 10, 2014 07:00

| Unit ID | Analyte | No. of Readings | No. of Detections | Avg. of Detections | Detection Range[2] |
|---|---|---|---|---|---|
| Unit 01 | $H_2S$ | 5274 | 625 | 0.2 ppm | 0.1 - 0.4 ppm |
| | LEL | 5274 | 0 | NA | < 1 % |
| | $SO_2$ | 5274 | 0 | NA | < 0.1 ppm |
| | VOC | 5274 | 19 | 0.2 ppm | 0.1 - 0.3 ppm |
| Unit 02 | $H_2S$ | 5576 | 643 | 0.1 ppm | 0.1 - 0.3 ppm |
| | LEL | 5576 | 0 | NA | < 1 % |
| | $SO_2$ | 5576 | 0 | NA | < 0.1 ppm |
| | VOC | 5576 | 51 | 0.1 ppm | 0.1 - 0.2 ppm |
| Unit 03 | $H_2S$ | 5367 | 199 | 0.1 ppm | 0.1 - 0.3 ppm |
| | LEL | 5367 | 0 | NA | < 1 % |
| | $SO_2$ | 5367 | 0 | NA | < 0.1 ppm |
| | VOC | 5367 | 83 | 0.1 ppm | 0.1 - 0.2 ppm |
| Unit 04 | $H_2S$ | 5372 | 201 | 0.1 ppm | 0.1 - 0.2 ppm |
| | LEL | 5372 | 0 | NA | < 1 % |
| | $SO_2$ | 5372 | 0 | NA | < 0.1 ppm |
| | VOC | 5372 | 4 | 0.1 ppm | 0.1 - 0.1 ppm |
| Unit 05 | $H_2S$ | 1294 | 208 | 0.1 ppm | 0.1 - 0.2 ppm |
| | LEL | 1294 | 0 | NA | < 1 % |
| | $SO_2$ | 1294 | 16 | 0.1 ppm | 0.1 - 0.1 ppm |
| | VOC | 1294 | 0 | NA | < 0.1 ppm |
| Unit 06 | $H_2S$ | 2048 | 797 | 0.3 ppm | 0.1 - 0.6 ppm |
| | LEL | 2048 | 0 | NA | < 1 % |
| | $SO_2$ | 2048 | 0 | NA | < 0.1 ppm |
| | VOC | 2048 | 185 | 0.1 ppm | 0.1 - 0.2 ppm |
| Unit 08 | $H_2S$ | 1265 | 359 | 0.2 ppm | 0.1 - 0.4 ppm |
| | LEL | 1265 | 0 | NA | < 1 % |
| | $SO_2$ | 1265 | 5 | 0.1 ppm | 0.1 - 0.1 ppm |
| | VOC | 1265 | 0 | NA | < 0.1 ppm |

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 3: AM510 $PM_{10}$ Monitoring Summary[1]
December 09, 2014, 2014 07:00 – December 10, 2014 07:00

| Serial No. | Location | No. of Readings | No. of Detections | Avg. Detection | Detection Range |
|---|---|---|---|---|---|
| **10601072** | AR01 | 3016 | 3016 | 0.02 | 0.003 - 2.816 mg/$m^3$ |
| **10408087** | AR02 | 2588 | 2588 | 0.084 | 0.054 - 0.311 mg/$m^3$ |
| **10704074** | | 550 | 550 | 0.123 | 0.113 - 0.278 mg/$m^3$ |
| **10704075** | AR03 | 29580 | 29570 | 0.015 | 0.001 - 19.885 mg/$m^3$ |
| **10704072** | AR04 | 3414 | 3371 | 0.008 | 0.001 - 0.061 mg/$m^3$ |

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*

# Appendix A

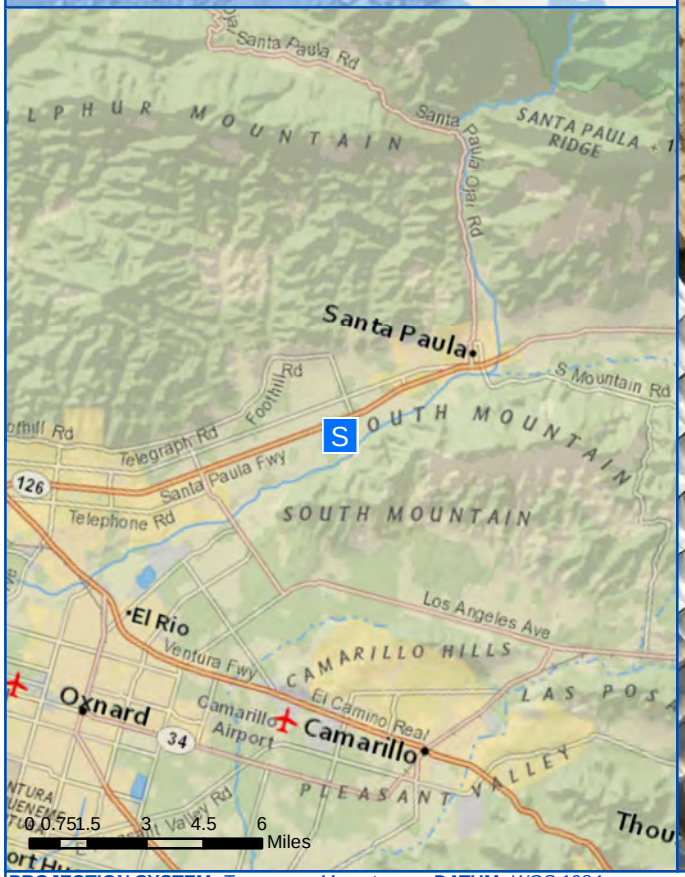
# Incident Maps:

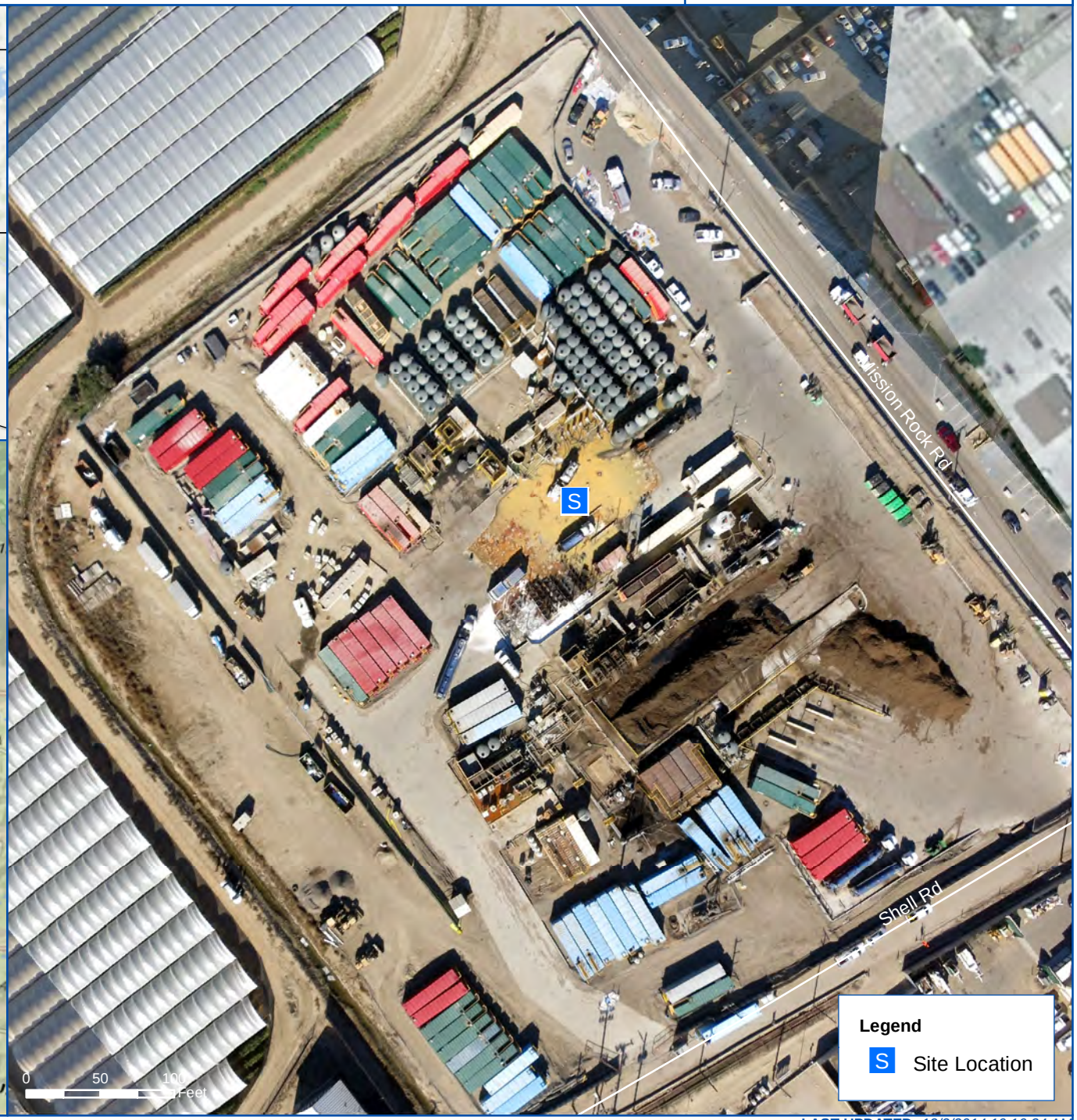
# Real-time Air Monitoring Locations and Incident Site

# Site Location

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


**PROJECTION SYSTEM:** *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/2/2014 10:10:34 AM*

# Aerial Overview - 12/09/2014

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


**PROJECTION SYSTEM:** *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/10/2014 11:13:00 AM*

# Fixed Community Real-Time Air Monitoring Station Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


**PROJECTION SYSTEM:** *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *11/25/2014 12:22:02 PM*

# Manually Logged Real-Time Air Monitoring Concentrations

## $Cl_2$ - Dec 09, 2014 07:00 to Dec 10, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


**PROJECTION SYSTEM:** *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/10/2014 9:04:31 AM*

# Manually Logged Real-Time Air Monitoring Concentrations

$H_2S$ - Dec 09, 2014 07:00 to Dec 10, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/10/2014 9:07:28 AM*

# Manually Logged Real-Time Air Monitoring Concentrations

HCl - Dec 09, 2014 07:00 to Dec 10, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


**PROJECTION SYSTEM:** *UTM13N* **COORDINATE SYSTEM:** *WGS84*

**Print Date:** *12/10/2014 9:08:36 AM*

# Manually Logged Real-Time Air Monitoring Concentrations

LEL - Dec 09, 2014 07:00 to Dec 10, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/10/2014 9:11:30 AM*

# Manually Logged Real-Time Air Monitoring Concentrations

$O_2$ - Dec 09, 2014 07:00 to Dec 10, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/10/2014 10:39:56 AM*

# Manually Logged Real-Time Air Monitoring Concentrations

## Peroxides - Dec 09, 2014 07:00 to Dec 10, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/10/2014 10:46:04 AM*

# Manually Logged Real-Time Air Monitoring Concentrations

## $PM_{10}$ - Dec 09, 2014 07:00 to Dec 10, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


**PROJECTION SYSTEM:** *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/10/2014 10:49:55 AM*

# Manually Logged Real-Time Air Monitoring Concentrations

$SO_2$ - Dec 09, 2014 07:00 to Dec 10, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


**PROJECTION SYSTEM:** *UTM13N* **COORDINATE SYSTEM:** *WGS84*

**Print Date:** *12/10/2014 10:51:48 AM*

# Manually Logged Real-Time Air Monitoring Concentrations

$H_2SO_4$ - Dec 09, 2014 07:00 to Dec 10, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


**PROJECTION SYSTEM:** *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/10/2014 10:54:56 AM*

# Manually Logged Real-Time Air Monitoring Concentrations

VOC - Dec 09, 2014 07:00 to Dec 10, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura


**PROJECTION SYSTEM:** *UTM13N* **COORDINATE SYSTEM:** *WGS84*

**Print Date:** *12/10/2014 10:59:18 AM*

# Appendix B:

# AreaRAE Trend Graphs, AM510 Trend Graphs, and AreaRAE/AM510 Air Monitoring Location Map

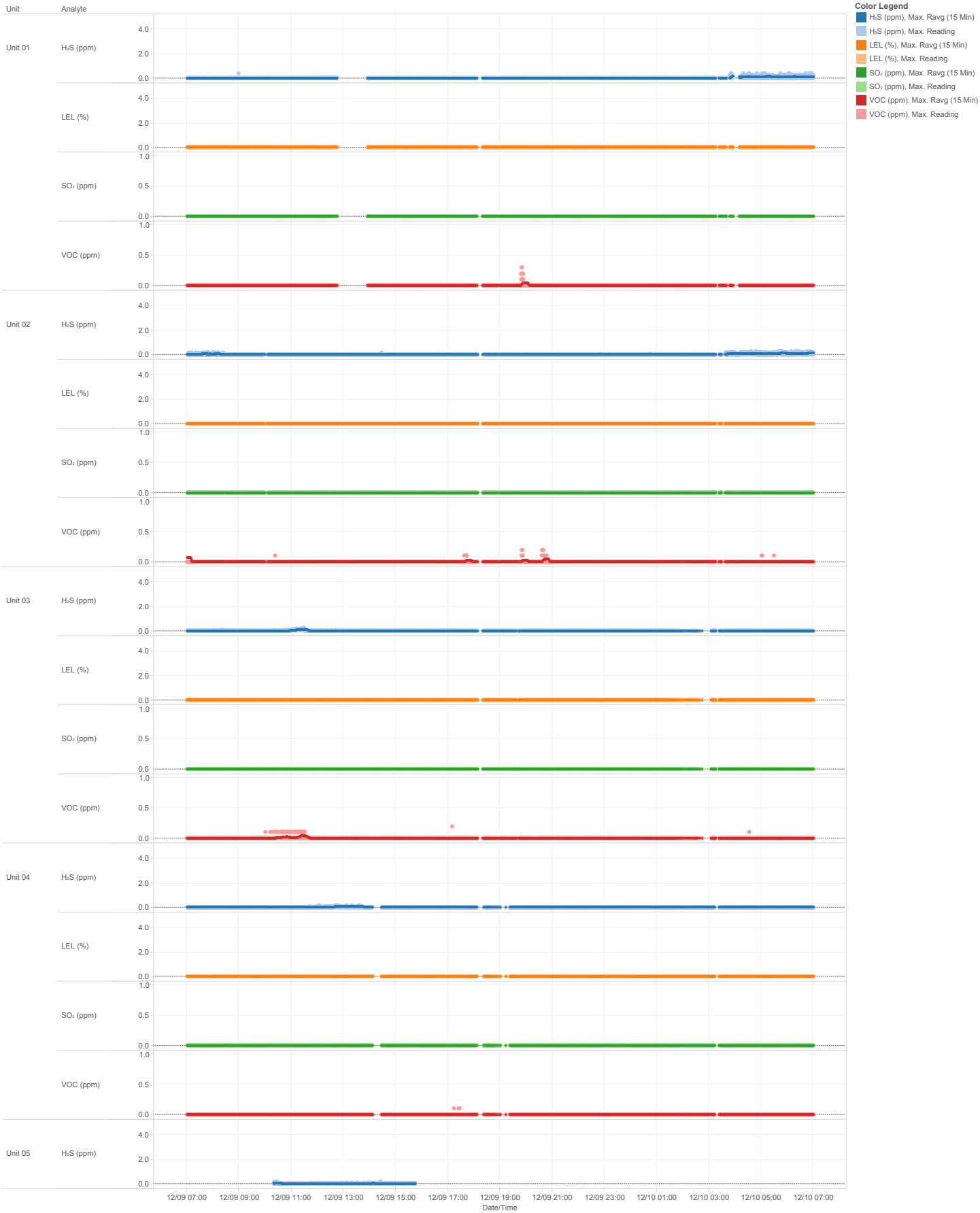
# AreaRAE and AM510 Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

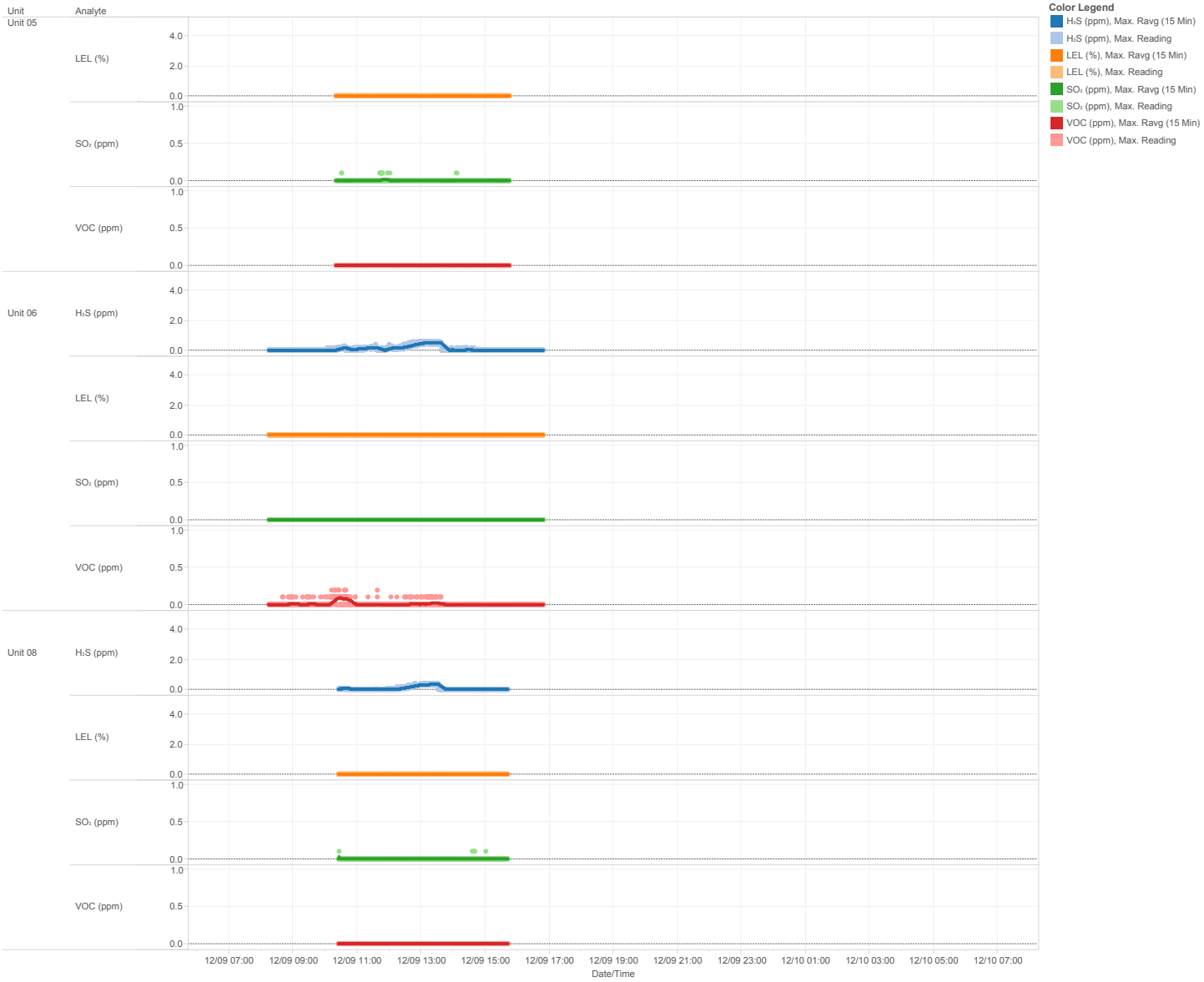

**PROJECTION SYSTEM:** *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/9/2014 3:28:23 PM*

**Patriot Environmental**
**AreaRAE Trend Graphs**
**12/09/2014 07:00 - 12/10/2014 07:00**



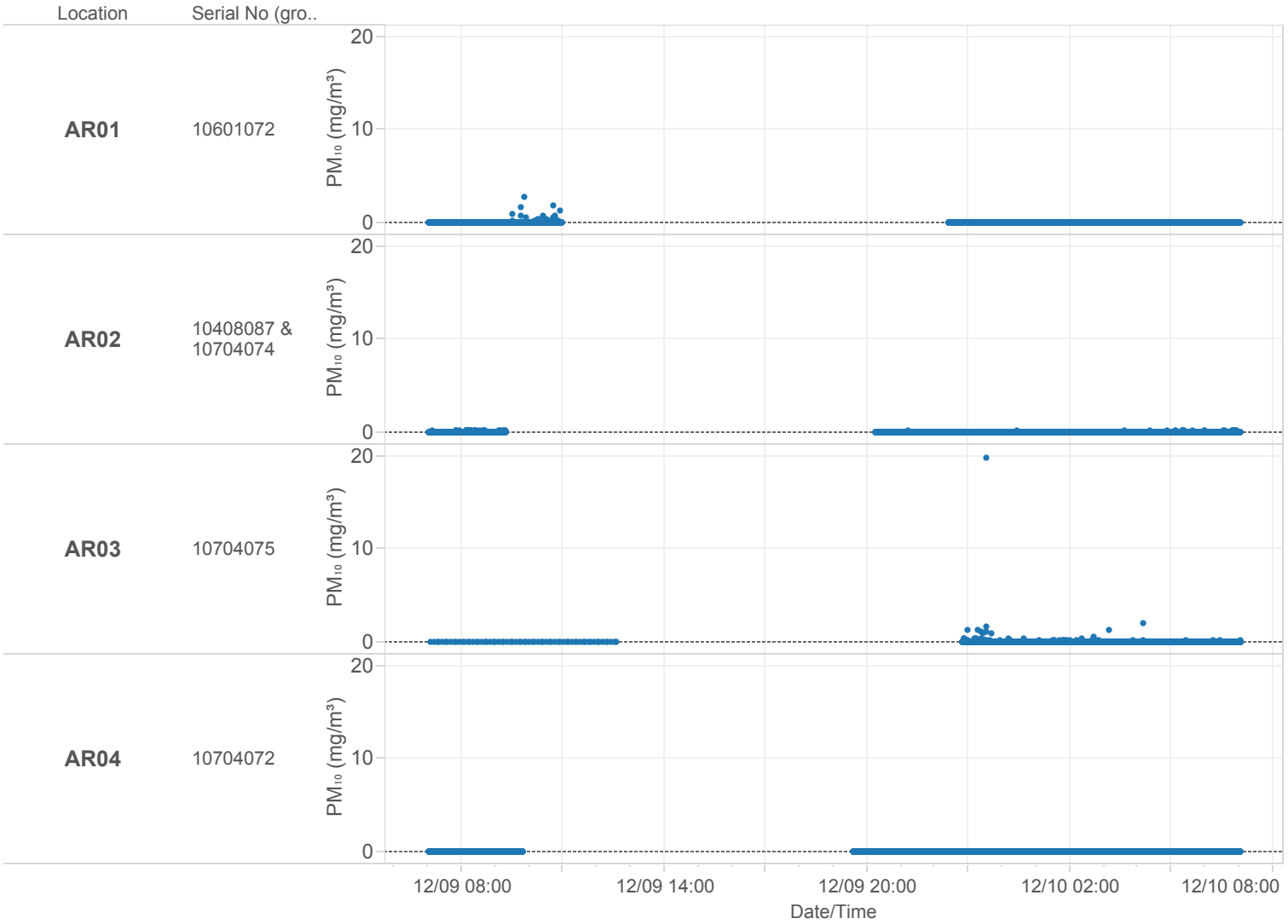

*- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format*
*- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"*

**Patriot Environmental**
**AreaRAE Trend Graphs**
**12/09/2014 07:00 - 12/10/2014 07:00**




*- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format*
*- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"*

# Patriot Environmental
# MISSION INCIDENT
# Datalogged AM510 ($PM_{10}$) Summary
# 12/09/2014 07:00 - 12/10/2014 07:00




*- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format*